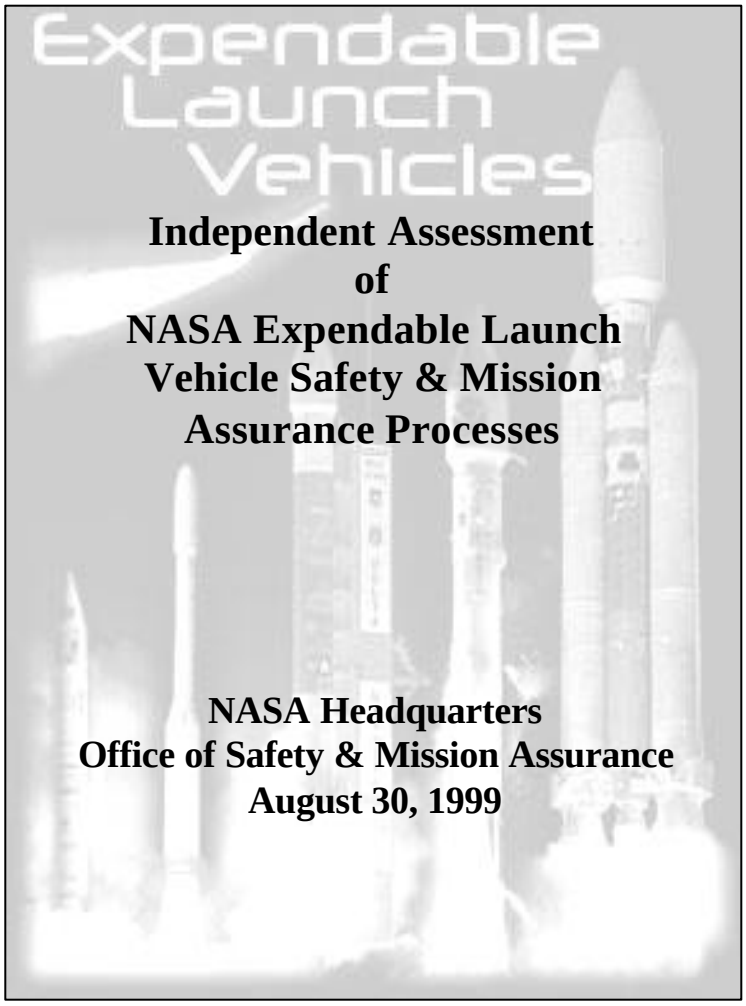
This document contains excerpts from the Expendable Launch Vehicles (ELV) Independent Assessment Report (title page shown below). Only those sections which relate to the PBMA element **Operations** are displayed.

The complete report is available through the PBMA web site, Program Profile tab.



### 1.2.6 Current ELV Launch Sites

The launch locations which support ELV launches include:

- Eastern Range (Cape Canaveral Air Force Station)
- Western Range (Vandenberg Air Force Base)
- Wallops Island
- Kodiak Island
- Kwajalein Island

## 3.2 Probable Causes and Assurance Process Gap Analysis

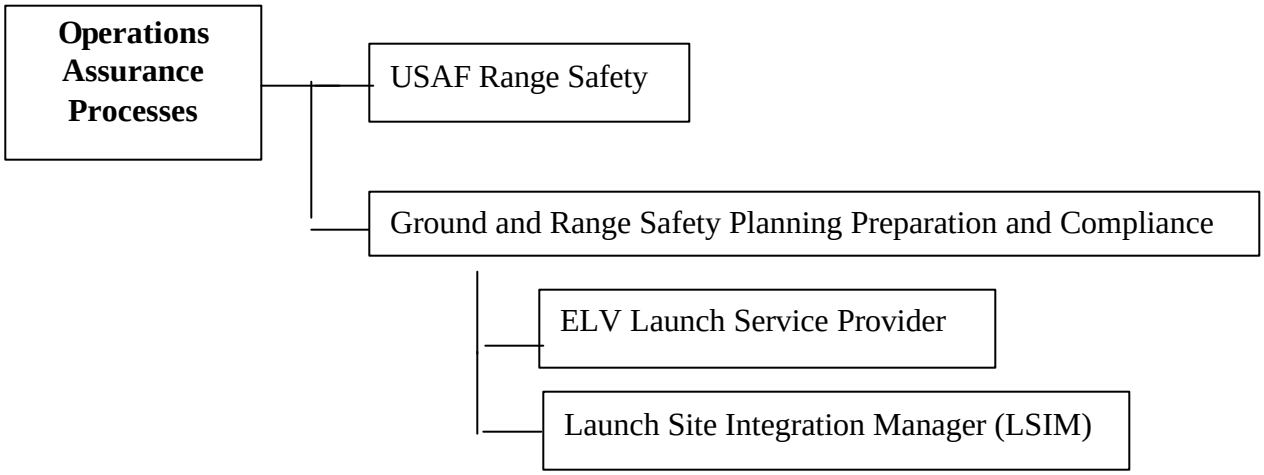
*ELV Failure Case Studies and Gap Analysis*

| | ELV Failure Description | General Comments | NASA ELV Assurance Process Or Activity That May Have Prevented This Mishap | Subjective Assessment High/Medium/Low Probability of Mishap Prevention |
|---|---|---|---|---|
| **12.** | **Atlas-Centaur (AC-67): 26 Mar 87 (NASA)**. Vehicle was struck by lightning. Electrical transient cause erroneous yaw maneuver and loss of vehicle control. | Presently NASA maintains conservative conditions for such a launch. Still, failure occurred under NASA processes. | NASA/KSC and USAF CCAFS have established weather rules and constraints which would prevent a re-occurrence of this mishap. | High |

## A.7 Operations Assurance Processes

Operations assurance processes include all of those activities centered around public safety, worker safety, and payload mission assurance.

In the case of commercially obtained launch services the primary responsibility for safety planning and compliance lies with the launch service provider. The ELV Program Launch Site Integration Manager is responsible for assisting the service provider and the spacecraft customer in fulfilling all safety (and other) launch site requirements. The NASA SMA organization is responsible for assuring the safety of activiities that take place in NASA payload processing facilities. Ultimate range safety responsibilities reside with the Base Commander and are codified in the EWR 127-1 requirements document.




USAF Range Safety

The launch service provider has primary responsibility for interfacing with the USAF 45th Space Wing at KSC and the 30th Space Wing at VAFB to assure compliance with EWR-127-1 requirements for range safety and flight termination system design, manufacturing, and test. NASA/SMA has an insight role in maintaining knowledge and understanding of range safety policy.

Ground and Range Safety Planning Preparation and Compliance

**Launch Service Provider Responsibilities for Safety & Assurance** - The launch vehicle provider and the USAF have primary responsibility for ground safety activities related to commercial launches from the Cape Canaveral Air Force Station. NASA owns and operates Space Launch Complex (SLC) 2 at VAFB and is responsible for ground safety process implementation at that site.

**Generic (All Launch Services) Range And Ground Safety Responsibilities of the Launch Service Provider -** Launch service providers are responsible for range support and making provisions for the necessary range approval and scheduling of supporting services for each launch which typically include the following:

- RF radiation clearance
- Fire protection
- Base security, including security police and badge control
- Equipment support
- Shop and laboratory services
- Fluids, gases, and propellants
- Range scheduling
- Range safety functions
- Meteorology
- Communications (local and downrange) data circuits
- Environmental health services
- Metric C-band beacon (radar)
- Telemetry
- Video and still camera coverage of launch
- Station acquisition predictions
- Non-standard servicetracking services (as needed)

**Roles And Responsibilities Of Launch Site Integration Manager (LSIM) -** The LSIM is the point of contact for customers with payloads to be launched on an expendable launch vehicle and serves as liaison between the customer and KSC management. The LSIM functions in two major arenas: project planning and the ground operation phase at KSC. The LSIM is considered the customer's principal launch site integration interface and as such becomes a source of authority to the payload customer regarding KSC policies, roles and responsibilities, capabilities, and requirements. For major or unique payloads, such as HST, EOS, Cassini, the LSIM may be assigned six to eight years in advance of launch to work long-lead issues.

Other responsibilities include:

- assuring that KSC management and working elements are satisfied with payload plans
- assuring that payload customer is satisfied with KSC planning for their support and operations
- coordinating development of the Launch Site Support Plan

<u>LSIM Safety and Assurance Roles</u>

The LSIM plays a key role in coordinating and assuring compliance with the documentation and planning required by the range under the requirements of EWR 127-1. The LSIM is responsible for coordinating and verifying the customer development of the Payload Safety Package and the presentation of the document at the Ground Safety Review. The LSIM also verifies the need for special safety waivers and

coordinates NASA/SMA surveillance of hazardous operations at least 24 hours in advance.

The LSIM is responsible for assuring that Material Safety Data Sheets (MSDS's) are provided for all hazardous (toxic, biological, and/or radiological) materials. The LSIM is also responsible for confirming that customers have training regarding hazardous material storage, handling, and disposal. The LSIM also plays a safety clearance coordination role with regulatory agencies including, the Department of Energy, the EPA, the State of Florida, and Brevard County, as well as KSC Biomedical and KSC Protection Services.